In the next sections he shows that the penetrating and magnifying powers, so far from assisting each other, will often prove reciprocally detrimental, which he thinks may be explained by admitting that while the light collected is employed in magnifying an object, it cannot be exerted in giving penetrating power, to which perhaps ought to be added the detrimental effect of the magnifying power on the heterogeneous ingredients floating in the atmosphere. Whatever be the cause, the fact is proved by various observations.

Lastly, he shows that as we must not limit our vision within the sphere of the single stars, we must call the united lustre of the sidereal system to our aid in stretching forward into space. Supposing one of these clusters of 5000 stars to be at one of those immense distances to which only a 40-feet reflector can reach, he calculates that this distance will exceed at least 300,000 times that of the most remote fixed star visible to the naked eye. He concludes with a rough calculation how much time it would take to sweep the heavens with a penetrating power of such an immense extent; and finds that in this climate, with his 40-feet reflector, with a magnifying power of 1000, this operation for the whole sphere would take no less than 811 years.

A second Appendix to the improved Solution of a Problem in physical Astronomy, inserted in the Philosophical Transactions for the Year 1798, *containing some further Remarks, and improved Formulæ for computing the Coefficients* A *and* B*; by which the arithmetical Work is considerably shortened and facilitated. By the Rev.* John Hellins, *B.D.F.R.S. and Vicar of* Potter's Pury *in* Northamptonshire. Read Dec. 12, 1799. [*Phil. Trans.* 1800, *p.* 86.]

This paper relates to an improved solution of a problem by which swiftly converging series are obtained, which are useful in computing the mutual perturbations of the planets; and contains some further remarks and improved formulæ for computing the coefficients, by which the arithmetical work is considerably shortened and facilitated.

Account of a Peculiarity in the Distribution of the Arteries sent to the Limbs of slow-moving Animals; together with some other similar Facts. In a Letter from Mr. Anthony Carlisle, *Surgeon, to* John Symmons, *Esq. F.R.S.* Read Jan. 9, 1800. [*Phil. Trans.* 1800, *p.* 98.]

This peculiarity was first observed in the axillary arteries and in the iliacs of the Lemur tardigradus, which at their entrance into the upper and lower limbs were found to be suddenly divided into a considerable number of equal-sized cylinders, which occasionally anastomosed with each other, and were regularly distributed on the muscles; whilst the arteries proceeding to the other parts of the body divided in the usual arborescent form.

Upon prosecuting this inquiry, it was found that the Bradypus

tridactylus, and in some measure also the didactylus, has a similar distribution of these arteries.

This peculiar disposition of the arteries in the limbs of these slow-moving quadrupeds, it is thought cannot but retard the velocity of the blood passing into the muscles of the limbs. Whence the well known sluggishness of the animals, to whom this configuration seems as yet peculiar, will perhaps be ultimately accounted for. Something similar has been observed in the carotid artery of the lion, which it is thought may be subservient to the long continued exertion of the muscles of his jaws, in holding a powerful animal for a length of time; and lastly, it is conjectured that the ruminating animals have a somewhat similar aplexus of arteries in the neck, which operates in retarding the velocity of the fluids in those parts.

Outlines of Experiments and Inquiries respecting Sound and Light. By Thomas Young, *M.D. F.R.S. In a Letter to* Edward Whitaker Gray, *M.D. Sec.R.S.* Read Jan. 16, 1800. [*Phil. Trans.* 1800, *p.* 106.]

We are here presented with a numerous set of experiments and observations, which the author does not deliver as a series calculated to elucidate any particular object, but rather as the results of the first steps of an investigation; which being of considerable magnitude, and not to be accomplished in a short period of time, are here brought forward in a detached form, in order to preserve them from oblivion, should any unforeseen circumstances prevent his continuing the pursuit. They are classed under sixteen different heads, of which the following are the titles, and some of the principal inductions.

1. *Of the Quantity of Air discharged through an Aperture.*—This was deduced from the quantity of pressure of water, on a body of air rushing through a small aperture at the end of a tube. The result was, that the quantity of air discharged by a given aperture is nearly in the subduplicate ratio of the pressure; and that the ratio of the expenditures by different apertures, with the same pressure, lies between the ratio of their diameters, and that of their areas.

2. *Of the Direction and Velocity of a Stream of Air.*—These were determined by the stream, produced by a known pressure, being made to impinge, in a perpendicular direction, against a white plate, on which a scale of equal parts was delineated, and which was thinly covered with a coloured liquid. The results were here inferred from the breadth of the surface of the plate laid bare by the stream.—The experiments being repeated at different distances between the orifice and the plate, the longitudinal form of the stream could be hence deduced, their sections being bounded by curves, the nature of which could be determined by their ordinates and abscissæ. The numerous results obtained in this manner are entered in various tables, and likewise illustrated by figures, in which the longitudinal and not the transverse sections are exhibited to the eye.

3. *Ocular Evidence of the Nature of Sound.*—This is produced by